

REMARKS

Claims 1-53 are pending in the present application. Applicant has amended claims 1, 5, 6, 23, 27, 28, 52, and 53. Support for the present claim amendments can be found throughout the specification and is discussed further below.

Claims 1-4, 8-18, 23-26, 30-40, and 45 stand rejected under 35 U.S.C. § 102(b) as being anticipated by United States Patent No. 5,773,146 to Lawton et al. (hereinafter "Lawton '146"). Claims 1-4, 8-20, 23-26, 30-42, and 45-51 stand rejected under 35 U.S.C. § 102(b) as being anticipated by United States Patent Application Publication No. 20020051882 to Lawton et al. (hereinafter "Lawton '882"). Claims 5-7, 22, 27-29, 44, and 52-53 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Lawton '146 in view of Lawton '882.

Applicant respectfully requests consideration of the application in view of the following remarks.

Claims 1-4, 8-20, 23-26, 30-40, and 45-51 - 35 U.S.C. § 102(b)

The rejection of claims 1-4, 8-18, 23-26, 30-40 and 45 under 35 U.S.C. § 102(b) as being anticipated by Lawton '146 is respectfully traversed. The rejection of claims 1-4, 8-20, 23-26, 30-42 and 45-51 as being anticipated by Lawton '882 under 35 U.S.C. § 102(b) is also respectfully traversed.

A. Claims 1-4 and 8-20

Applicant has amended claim 1 to incorporate some of the limitations of claim 5. Support for the present amendment can be found in original claim 5 and in paragraphs [0009] and [0027], as well as elsewhere throughout the specification. Applicant respectfully asserts that presently amended claim 1 is not anticipated by Lawton '146 or by Lawton '882 under 35 U.S.C. § 102(b). Neither reference discloses "a starch mixture comprising a high viscosity starch and a low viscosity starch cooked at a temperature sufficient to solubilize at least 50% of the high viscosity starch and to solubilize at least 50% of the low viscosity starch, wherein the high viscosity starch comprises a starch having an amylose content of > 50% and the low viscosity starch comprises a starch comprising > 50% amylose." In particular, and as noted in the Office Action, "Lawton

‘146 and Lawton ‘882 . . . do not specifically teach a sizing composition wherein both the high viscosity starch and low viscosity starch have an amylose content of > 50%.”¹

Accordingly, Applicant respectfully requests that the rejections of claim 1 under 35 U.S.C. § 102(b) based on Lawton ‘146 and Lawton ‘882 be withdrawn.² As claims 2-4 and 8-20 depend from and further limit claim 1, Applicant respectfully asserts that claims 2-4 and 8-20 are also not anticipated by Lawton ‘146 or Lawton ‘882, and respectfully requests that the rejection of these claims also be withdrawn.

B. Claims 23-26 and 30-42

Applicant has amended claim 23. Support for the present amendment can be found in original claim 27 and in paragraphs [0009] and [0027], as well as elsewhere throughout the specification. For reasons consistent with those provided in the discussion of claim 1 above, Applicant respectfully asserts that presently amended claim 23 is not anticipated by Lawton ‘146 or by Lawton ‘882 under 35 U.S.C. § 102(b). As noted in the Office Action, neither reference “teach[es] a sizing composition wherein both the high viscosity starch and low viscosity starch have an amylose content of > 50%.”³ Accordingly, Applicant respectfully requests that the present rejection of claim 23 be withdrawn.⁴ As claims 24-26 and 30-42 depend from and further limit claim 23, Applicant respectfully asserts that claims 24-26 and 30-42 are also not anticipated by Lawton ‘146 or by Lawton ‘882, and respectfully requests that the rejection of these claims also be withdrawn.

C. Claims 45 and 46

Claim 45 recites a glass fiber strand comprising a plurality of the glass fibers of claim 23. In view of the discussion of claim 23 above, Applicant respectfully asserts that claim 45 is not anticipated by Lawton ‘146 or by Lawton ‘882 under 35 U.S.C. § 102(b)

¹ Office Action mailed May 23, 2005, page 6.

² Applicants also respectfully traverse any potential rejection of amended claim 1 under 35 U.S.C. § 103(a) based on Lawton ‘146 in view of Lawton ‘882, Applicants respectfully traverse such a combination for the reasons set forth below traversing the rejection of original claim 5.

³ Office Action mailed May 23, 2005, page 6.

⁴ Applicants also respectfully traverse any potential rejection of amended claim 23 under 35 U.S.C. § 103(a) based on Lawton ‘146 in view of Lawton ‘882, Applicants respectfully traverse such a combination for the reasons set forth below traversing the rejection of original claim 27.

and respectfully requests that the present rejection be withdrawn. As claim 46 depends from and further limits claim 45, Applicant respectfully asserts that claim 46 is not anticipated by Lawton '146 or by Lawton '882, and respectfully requests that the rejection of this claim also be withdrawn.

D. Claim 47

Claim 47 recites a method of producing an at least partially coated glass fiber comprising applying to a glass fiber the sizing composition of claim 1. In view of the discussion of claim 1 above in relation to Lawton '882, Applicant respectfully asserts that claim 47 is not anticipated by Lawton '882 under 35 U.S.C. § 102(b) and respectfully requests that the rejection of this claim be withdrawn.

E. Claims 48-51

Claim 48 recites a method of weaving wherein the glass fiber strands of the weaving method comprise a plurality of glass fibers of claim 23. In view of the discussion of claim 23 above in relation to Lawton '882, Applicant respectfully asserts that claim 48 is not anticipated by Lawton '882 and respectfully requests that the present rejection be withdrawn. As claims 49-51 depend from and further limit claim 48, Applicant respectfully asserts that claims 49-51 are also not anticipated by Lawton '882 and respectfully requests that the rejection of these claims also be withdrawn.

Claims 5-7, 22, 27-29, 44, and 52-53 - 35 U.S.C. § 103(a)

The rejection of claims 5-7, 22, 27-29, 44, and 52-53 as being unpatentable over Lawton '146 in view of Lawton '882 is respectfully traversed.

A. Claims 5-7 and 22

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.⁵ Applicant respectfully submits that the combination of Lawton '146 and Lawton '882 does not teach or suggest all the limitations of amended claim 1.

As previously discussed, the present Office Action states that Lawton '146 and Lawton '882 "do not specifically teach a sizing composition wherein both the high viscosity starch and low viscosity starch have an amylose content greater than 50%."⁶ In view of this, the Office Action additionally states that Lawton '146 and Lawton '882 teach the formation of blends comprising a high viscosity starch and low viscosity starch, which would have "provided a suggestion to the skilled artisan that other high viscosity starches could be blended with low viscosity starches" in the formation of an aqueous sizing composition.⁷

Applicant respectfully submits that the general teaching of combining a high viscosity starch with a low viscosity starch does not provide a teaching or reasonable expectation that high amylose content starches can be combined to form an aqueous sizing composition wherein at least 50% of the high amylose starches are solubilized.

Lawton '146 and Lawton '882 do not address percent solubilization of the starches in a sizing composition. The percent solubilization of the starches can affect properties of the sizing composition. As discussed below, starch solubilization can depend on several factors including amylose content of the starch, starch cooking time, and starch cooking temperature. Applicant respectfully submits that a general disclosure of combining a high viscosity starch and a low viscosity starch without specific reference to percent solubilization of the starches in a sizing composition is insufficient to teach or suggest a combination of high amylose starches wherein the high amylose starches are at least 50% solubilized.

Starches comprise the chemical species amylose and amylopectin. As set forth below, the amylose content of the starches can also affect the properties of a sizing

⁵ *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

⁶ Office Action mailed May 23, 2005, page 6.

⁷ *Id.*

composition. According to Narpinder Singh, Kawaljit Singh Sandhu, and Manider Kaurr, "Physicochemical Properties Including Granular Morphology, Amylose Content, Swelling and Solubility, Thermal and Pasting Properties of Starches from Normal, Waxy, High Amylose and Sugary Corn," *Progress in Food Biopolymer Research*, Vol. 1, 2005:

When starch molecules are heated in excess water, the crystalline structure is disrupted and water molecules become linked by hydrogen bonding to the exposed hydroxyl groups of amylose and amylopectin, which results in an increase in granule swelling and solubility (Singh et al., 2003)...High amylose corn [starch] showed lower swelling power and solubility of 6.3 g/g and 12.4 wt%. High amylose corn starches showed reduction in granule swelling owing to the overall reduced level of amylopectin, the starch component principally responsible for the granular structure, as well as the possibility that amylose acts as a resistant to swelling (Richardson et al., 2000).

The swelling power of starch has been reported to depend on water holding capacity of starch molecules by hydrogen bonding (Lee & Osman, 1991). Hydrogen bonds stabilizing the structure of the double helices in crystallites are broken during gelatinization and are replaced by the hydrogen bonds with water, and the swelling is regulated by the crystallinity of the starch (Tester & Karkalas 1996). The granules become increasingly susceptible to shear disintegration as they swell, and they release soluble material as they disintegrate. Sandhya Rani and Bhattacharya (1989) indicated that starch granules with low amylose content being less rigid, swell freely when heated. The starch granules with higher amylose content, on the other hand, being better reinforced and thus more rigid, probably swell less freely. A swelling of corn starch granules is the property of the amylopectin and the amylose acts as a diluent. However, amylose and lipids in the starches also inhibit swelling when the amylose-lipid complexes are formed.⁸

As delineated above, high amylose starches, such as HYLON and HI-SET 369, display intrinsically different swelling and solubility properties when compared to normal or low amylose content starches, such as National 1554. High amylose starches are increasingly resistant to swelling and solubilization in comparison to low amylose, high amylopectin starches. As a result, Applicant respectfully submits that a general

⁸ Narpinder Singh, Kawaljit Singh Sandhu, and Manider Kaurr, "Physicochemical Properties Including Granular Morphology, Amylose Content, Swelling and Solubility, Thermal and Pasting Properties of Starches from Normal, Waxy, High Amylose and Sugary Corn," *Progress in Food Biopolymer Research*, Vol. 1, 2005, pp. 45-46.

disclosure of combining a low viscosity starch with a high viscosity starch without reference to amylose and amylopectin content is not predictive of a sizing composition comprising high amylose starches wherein at least 50% of the high amylose starches are solubilized.

In view of the foregoing, Applicant respectfully asserts that claim 1 is patentable over Lawton '146 in view of Lawton '882. As claims 5-7 and 22 depend from claim 1 or an intervening dependent claim, Applicant respectfully asserts that claims 5-7 and 22 are also patentable over Lawton '146 in view of Lawton '882 and respectfully requests that the rejection of these claims be withdrawn as well.

B. Claims 27-29, and 44

For reasons consistent with those provided in the discussion of claims 5-7 and 22, Applicant respectfully asserts that claims 28-29, and 44 are patentable over Lawton '146 in view of Lawton '882 and respectfully requests that the rejection of claims 28-29, 44, 52, and 53 also be withdrawn.

C. Claims 52 and 53

Applicant has amended claims 52 and 53. Support for the present amendments to claims 52 and 53 can be found in paragraphs [0009] and [0027], as well as elsewhere throughout the specification. For reasons consistent with those provided in the discussion of claims 5-7 and 22, Applicant respectfully asserts that claims 52 and 53 are patentable over Lawton '146 in view of Lawton '882.

CONCLUSION

For the foregoing reasons, a favorable Office Action is respectfully solicited. The Examiner is respectfully invited to contact J. Jason Link at 336.607.7443 to discuss any matter relating to this application.

Respectfully submitted,

November 23, 2005
Date

J. Jason Link
J. Jason Link
Registration No. 44,874

Kilpatrick Stockton LLP
1001 West Fourth Street
Winston-Salem, NC 27101
336.607.7443